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ABSTRACT

This report studies the influence of professional reference groups on the decisions of teachers. The two professional groups were categorized as either mathematicians or educators in order to determine which group was more influential. Preservice secondary school mathematics teachers at the University of Texas at Austin were randomly assigned to experimental and control groups. Thirty-six hypothetical classroom teaching situations were written, each accompanied by three potential resolutions. For the subjects in the experimental groups, the labels "mathematicians" and "educators" were randomly assigned to different resolutions on each of 24 of the 36 situations. Responses from the control and experimental groups indicated that professional reference groups of mathematicians and educators influence the decisions of preservice secondary school mathematics teachers in projected classroom situations. The procedure was insensitive to any differential influence between the two reference groups. A five-item bibliography is included. (MJM)

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SUMMARY

THE INFLUENCE OF PROFESSIONAL REFERENCE GROUPS ON DECISIONS OF PRESERVICE TEACHERS

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Problem

Some professionals believe that methods courses for secondary school mathematics have negligible impact on the behavior of the teacher when he finally arrives in his own classroom. Others argue strongly the importance of such courses. There appears to be relatively little empirical evidence supporting either position. In view of the exposure of future teachers to the opinions of professionals, an interesting question is: Will the opinions of professionals influence the future classroom decisions of the teacher? Further, since the opinionating professionals can be generally categorized as either mathematicians or educators, is one of these groups more influential than the other?

Hypothesis One: Professional reference groups of mathematicians and educators influence the decisions of preservice secondary school mathematics teachers in projected classroom situations.

Hypothesis Two: The professional reference group of mathematicians exerts more influence than the professional reference group of educators on the decisions of preservice secondary school mathematics teachers.

[1]This paper is a partial report of the primary author's dissertation study at The University of Texas at Austin.

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The second hypothesis was based on the Balance Theory of Heider (1946) which is described below.

The Concept of Influence

Influence is not conceptualized uniquely in the literature. Crutchfield (1955, 1959) observed substantial amounts of yielding of personal opinion under group pressure. Kretch et al. (1962) labeled such yielding "conformity [p. 506]." Asch (1956) found that subjects tended to 'conform' even to dramatically illogical group stances.

For this study, Ss were presented with hypothetical classroom problems, each with three potential resolutions. The experimental treatment consisted of printed labels "mathematicians" and "educators" adjacent to different resolutions. Ss were told that the labels corresponded to the most popular choices from a national survey of corresponding professionals. If Ss' choices of resolutions differed in the presence of the labels from the choices without the labels, it was inferred that Ss were influenced.

Balance Theory

Heider (1946) described the cognitive structure of a single individual, P, in terms of a positive relation, reflecting P's perceptions of the relation between two objects or other persons.

Kretch et al. (1962) interpreted this theory for triads as shown in Figure 1.

INSERT FIGURE 1 HERE

P denotes the S, *O* denotes an object toward which P has an attitude, and X denotes a person (or persons) toward whom P has an attitude. The segment between *O* and X represents a perceived (by P) attitude of X toward *O*. Kretch

et al. attach signs to the three segments to represent positive (+) or negative (-) attitudes and state that the resulting cognitive system is balanced if the product of the three signs is positive.

The triad for this study is presented in Figure 2.

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INSERT FIGURE 2 HERE

- - - - - - - - - - - - - - - - -

The Ss chose mathematics as a teaching field, so it was assumed that they had positive attitudes toward mathematics. It was further assumed that they had positive attitudes toward mathematicians as a professional reference group. (See Figure 3)

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INSERT FIGURE 3 HERE

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To be balanced, the two unsigned relationships must be either both positive or both negative. The Es believed that Ss perceived a negative relationship between the two reference groups. This belief was based on the subjective observation that preservice mathematics teachers attach more worth to mathematics courses than professional education courses. This necessitated that the triad be balanced with negative signs. It was expected that the Ss would be influenced more by the opinions of mathematicians than by the opinions of educators.

Procedure

Preservice secondary school mathematics teachers at The University of Texas at Austin were randomly assigned to experimental (N = 28) and control (N = 35)

groups. Thirty-six hypothetical classroom teaching situations were written, each accompanied by three potential resolutions. For the Ss in the experimental groups, the labels "mathematicians" and "educators" were randomly assigned to different resolutions on each of 24 of the 36 situations. The remaining 12 were placebo items and the two labels were assigned to the same resolution. The situations, the resolutions, and the appropriate labels were printed in booklets. The booklets were distributed to the Ss with printed instructions explaining that the labels represented the most popular opinions of the respective groups as determined by a national survey. The responses of each S was recorded as an ordered triple (a, b, c), where a denotes the number of times the S chose a resolution with the label "mathematicians," b denotes the number of times the S chose a resolution with the label "educators," and c denotes the number of times the S chose a resolution with no label.

For the control group the same situations were used. No labels were attached to the resolutions, and Ss were asked only to indicate the most desirable resolution in each case. The responses of these Ss were matched with randomly generated data so that their responses were also recorded as ordered triples (a, b, c), where the coordinates represented the number of agreements with imaginary labels.

Results

The distributions of agreements with a reference group are presented in Table 1.

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INSERT TABLE 1 HERE

- - - - - - - - - - - - - - - - -

The computed χ^2 statistic was 62.79 ($p < .001$). The distribution of subjects in experimental and control groups are presented in Table 2.

INSERT TABLE 2 HERE

Figures 4 and 5 present the graphs of the cumulative distributions.

INSERT FIGURES 4 AND 5 HERE

Application of the Kolmogorov-Smirnov test to these distributions yielded statistics that were significant at the .03 level for the comparison with respect to the label "mathematicians" and the .01 level with respect to the label "educators" (see Table 3).

INSERT TABLE 3 HERE

Table 4 presents the responses of the experimental subjects.

INSERT TABLE 4 HERE

Application of the Wilcoxon matched-pairs signed-rank test yielded a z-value of $-.28$, which was not significant at the .05 level.

Discussion

The significant values generated by the application of the Kolmogorov-Smirnov test supported Hypothesis 1. Attaching labels did influence the responses of the Ss. The procedure was insensitive to any differential influence between the two reference groups.

The sample may have been atypical of the entire population of prospective secondary school mathematics teachers. The classroom situations may not have been realistic; they certainly were not actual classroom experiences.

The experimental design is easily generalizable to any situation in which one or more reference groups potentially exert influence.

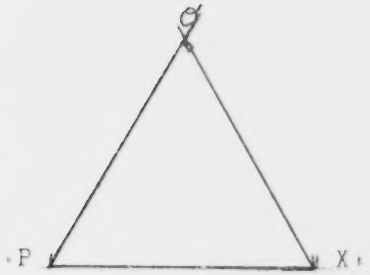

FIGURE 1

Heider's Basic Triad

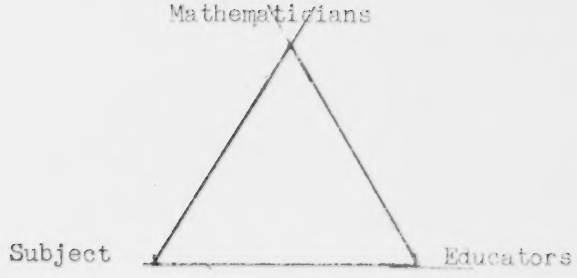

FIGURE 2

Unsigned Triad

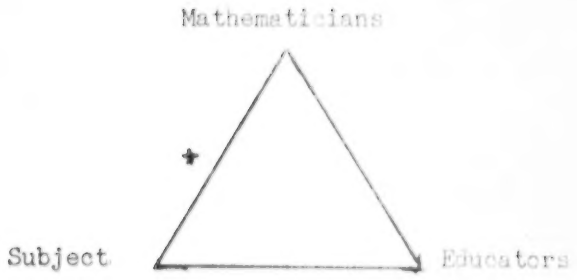

FIGURE 3

Incomplete Triad

TABLE 1

Cumulative Response Distributions

Group	Number of Choices Coincident With the Label		
	Mathematicians	Educators	Blank
Experimental[a]	283	294	95
Control[b]	279	262	251

[a] total 672

[b] total 792

TABLE 2

Frequency Table of Subjects with Respect to Number of Choices Coincident with Labels

Label	Frequency of Coincident Choice																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Experimental Group																		
Mathematicians		1				1	2	5		5		4	3	1	1	3	1	1
Educators					1	1	3	1	3	3	1	3	6		1	2	1	2
Blank	4	3	6	4	3	2	3		1	1		1						
Control Group																		
Mathematicians					1	2	2	7	6	3	7	2	2	1				
Educators				1		3	4	10	3	3	5	1	2		1			
Blank				2	2	3	6	5	2	5	3	2	1	2				

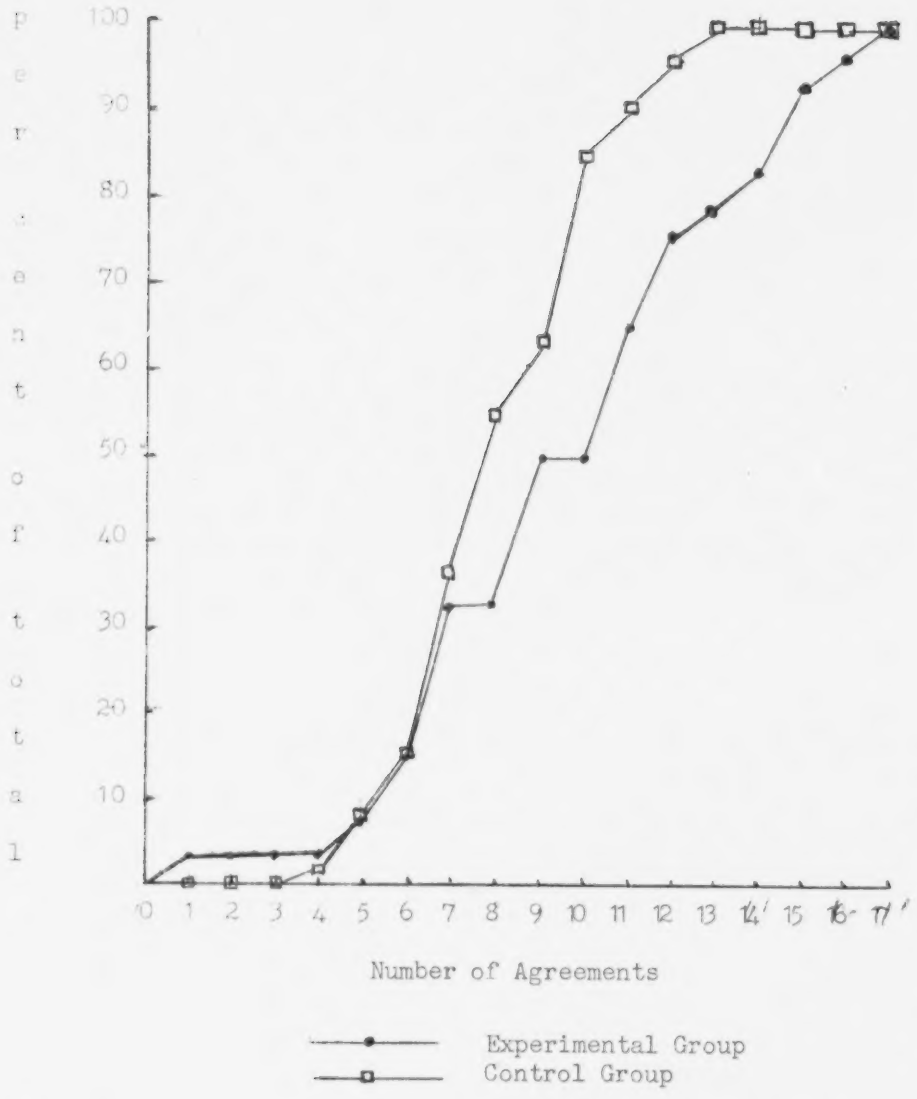

FIGURE 4

Cumulative Frequency Distributions of Subjects with Respect to Number of Choices Coincident with Label MATHEMATICIANS

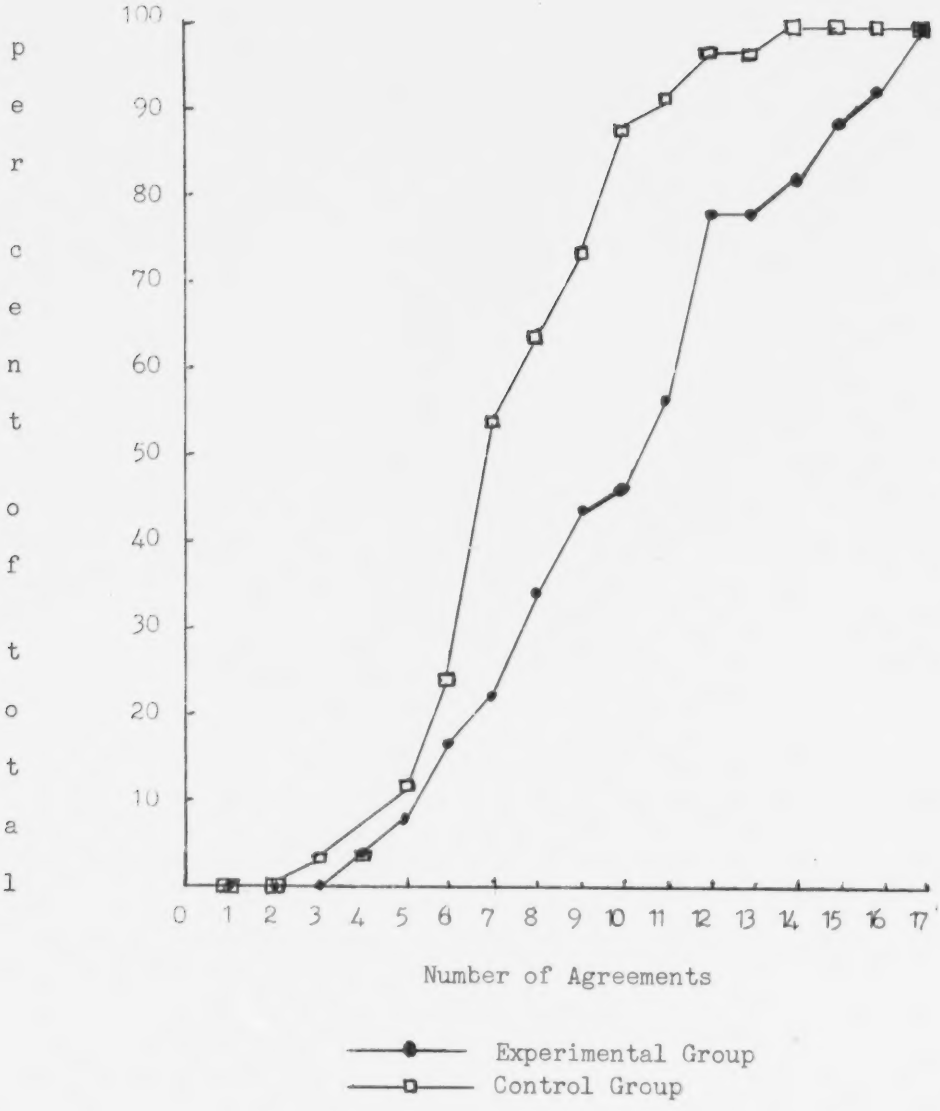

FIGURE 5

Cumulative Frequency Distributions of Subjects with Respect to Number of Choices Coincident with Label EDUCATORS

TABLE 3

Kolmogorov-Smirnov Statistics

Label	N_1	N_2	D[a]	$\frac{4D^2 N_1 N_2}{N_1 + N_2}$[b]
Mathematicians	28	33	.348	7.36*
Educators	28	33	.415	10.4**

* $p < .03$

** $p < .01$

a D = absolute value of maximum deviation of distributions.

b This statistic has approximately a χ^2 distribution with df = 2.

TABLE 4

Response Distributions, by Subject

Experimental Group

Subject Number	Number of Choices Coincident with Label		
	Mathematicians	Educators	Blank
1	11	11	2
2	12	10	2
3	11	12	1
4	11	11	2
5	9	11	4
6	15	9	0
7	7	14	3
8	9	12	3
9	5	17	2
10	16	6	2
11	7	17	0
12	6	12	6
13	7	8	9
14	9	12	3
15	17	6	1
16	6	12	6
17	13	8	3
18	7	16	1
19	7	12	5
20	15	9	0
21	14	8	2
22	9	4	11
23	11	9	4
24	15	5	4
25	12	7	5
26	9	15	0
27	12	6	6
28	1	15	8

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